

REMARKS

Claims 1, 2, 5-9, 12-17, 19, 21-23, 25-31, 33-38, and 40-43 are pending. Claims 3, 4, 10, 11, 18, 20, 24, 32, and 39 have been previously cancelled. Claims 1, 5, 8, 12, 15, 21, 26, 30, 33, 37 and 40 have been amended. No new matter has been introduced. Reexamination and reconsideration of the application are respectfully requested.

In the August 18, 2009 Office Action, the Examiner rejected claims 5, 12 and 21 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication 200400934961 to Kim ("the Kim reference") in view of the U.S. Patent No. 6,343,042 to Tsern et al. ("the Tsern reference"). The Examiner rejected claims 1-2, 6-9, 13-15, 23, 25-31, 33-38, and 40-43 under 35 U.S.C. § 103(a) as being unpatentable over the Kim reference in view of U.S. Patent No. 6,871,261 to Proebsting ("the Proebsting reference") further in view of the Tsern reference. The Examiner rejected claims 16-17, 19 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kim, Proebsting and Tsern reference in view of U.S. Patent No. 6,195,303 to Zheng ("the Zheng reference"). The applicant respectfully traverses the Examiner's rejection regarding the presently pending claims.

Claim 1, as amended, recites:

A method of operating a memory device having multiple memory bank arrays and being responsive to command signals and a plurality of bank address signals, the method comprising:

specifying at least one of a multiple of memory bank arrays to be refreshed using a plurality of bank address signals;

initiating in response to first command signals an auto-refresh command controlling an auto refresh operation to the specified at least one of the multiple memory bank arrays; and

initiating, before or during the auto refresh operation to the at least one of the specified memory bank arrays, a second command signal controlling a second operation, other than an auto refresh operation, to a second memory

bank array of the multiple memory bank arrays, which is not one of the at least one of the specified memory bank arrays being refreshed, **wherein multiple rows, but not all of the rows of the at least one memory bank array are refreshed in a staggered fashion relative to other rows in the memory bank array per the auto-refresh command and the second operation begins after all the rows have begun the auto refresh operation.**

The Examiner states that the Kim reference does not teach the last limitation of claim 1. The applicant agrees with the Examiner and respectfully submits that claim 1 distinguishes over the Kim reference. The Examiner states that the Proebsting reference does not teach a staggered refresh. The applicant agrees with the Examiner and respectfully submits that claim 1 distinguishes over the Proebsting reference, alone or in combination with the Kim reference.

The Examiner identifies that the Tsern reference discloses a staggered refresh wherein multiple rows of the at least one memory bank are refresh in a staggered fashion relative to the other rows in the memory bank array per the refresh, in col. 6, lines 1-12, where one row in each bank is refreshed at a time, before moving to the next row, thus the rows are being refreshed in a staggered fashion. (*Office Action, page 5*). However, the Tsern reference is directed to performing a staggered refresh on all rows. Specifically, the Tsern reference discloses in col. 6, lines 1 – 12 the following.

As illustrated in Fig. 9A, the present invention reverses the normal address sequencing of the memory core during refresh operations. Both normal refresh and self-refresh have the bank address bits as the LSBs, and the row address as the MSBs. **Thus, for each row, all the banks are sequenced through before the next row is addressed.** As will be discussed below, an on-chip row counter is used, so that the controller does not have to track row addresses. The sequencing of the bank addresses as the LSB works with the internal counter. The controller does not have to track row addresses during refresh, and only needs to send the bank address during each refresh operation.

In other words, in the Tsern reference each of the rows is sequenced through in the memory bank. This is not the same as a method of operating a memory device having multiple memory bank arrays and being responsive to command signals and a plurality of bank address signals, **wherein multiple rows, but not all of the rows of the at least one memory bank array are refreshed in a staggered fashion relative to other rows in the memory bank array per the auto-refresh command and the second operation begins after all the rows have begun the auto refresh operation**, as is recited in claim 1, as amended. The Tsern reference is “teaching away” from claim 1 because the Tsern reference is disclosing that all of the rows are refreshed in a staggered fashion and not that multiple rows, but not all of the rows of a memory bank array are refreshed. Teaching away from the art is a *per se* demonstration of the lack of prima facie obviousness. *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988). The Tsern reference is also teaching away from the Kim reference because the Kim reference is disclosing a self-refresh method including modes where a half of a bank refresh and a quarter of a memory bank refresh may occur (*Kim*, *paragraph [0010]*), whereas the Tsern reference is requiring that all of the rows be refreshed. Thus, the Tsern reference is completely opposite to the Kim reference in that the Tsern reference performs an operation on all rows in a memory bank and the Kim reference discloses that the operation is performed on identified rows in a memory bank. Accordingly, the applicant respectfully submits that the Tsern reference and Kim reference are not properly combinable. Therefore, the applicants respectfully submit that claim 1, as amended, distinguishes over the Kim / Proebsting / Tsern combination.

Independent claims 5, 12, 26, 30, 33, 37 and 40, all as amended, recite limitations similar to claim 1 as amended. Accordingly, applicant respectfully submits that claims 5, 12, 26, 30, 33, 37 and 40 distinguish over the Kim / Proebsting / Tsern combination for reasons similar to those discussed above in regard to claim 1.

Claims 2, 6 – 9, 13, 14, 27 – 29, 21, 34 – 36, 38 and 41 – 43 depend, directly or indirectly, on independent claims 5, 12, 26, 30, 33, 37 and 40. Accordingly, applicant respectfully submits that claims 2, 6 – 9, 13, 14, 27 – 29, 21, 34 – 36, 38 and 41 – 43 distinguish over the Kim / Proebsting / Tsern combination for the same reasons as those discussed above in regard to claim 1.

Independent claims 15 and 21, recite similar limitations to claim 1 and the applicant respectfully submits that claims 15 and 21 distinguish over the Kim / Proebsting / Tsern combination for reasons similar to those discussed above in regard to claim 1.

The Examiner utilizes the Zheng reference in regard to claims 16, 17, 19 and 22 and recites that it discloses a memory device, wherein the at least one specified memory bank array of the multiple memory bank arrays is determined based on which memory bank arrays have been refreshed. (*Office Action, page 17*). However, the Zheng reference does not disclose the highlighted limitation above, i.e., **wherein multiple rows, but not all of the rows of the at least one memory bank array are refreshed in a staggered fashion relative to other rows in the memory bank array per the auto-refresh command and the second operation begins after all the rows have begun the auto refresh operation**. Accordingly, applicant respectfully submits that claims 16, 17, 19 and 22 distinguish over the Kim / Proebsting / Tsern / Zheng

combination.

Applicant believes that the foregoing remarks place the application in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,

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